First Project X PM WGM Presentation

(Project Management Working Group Meeting)

by L Edward Temple Jr

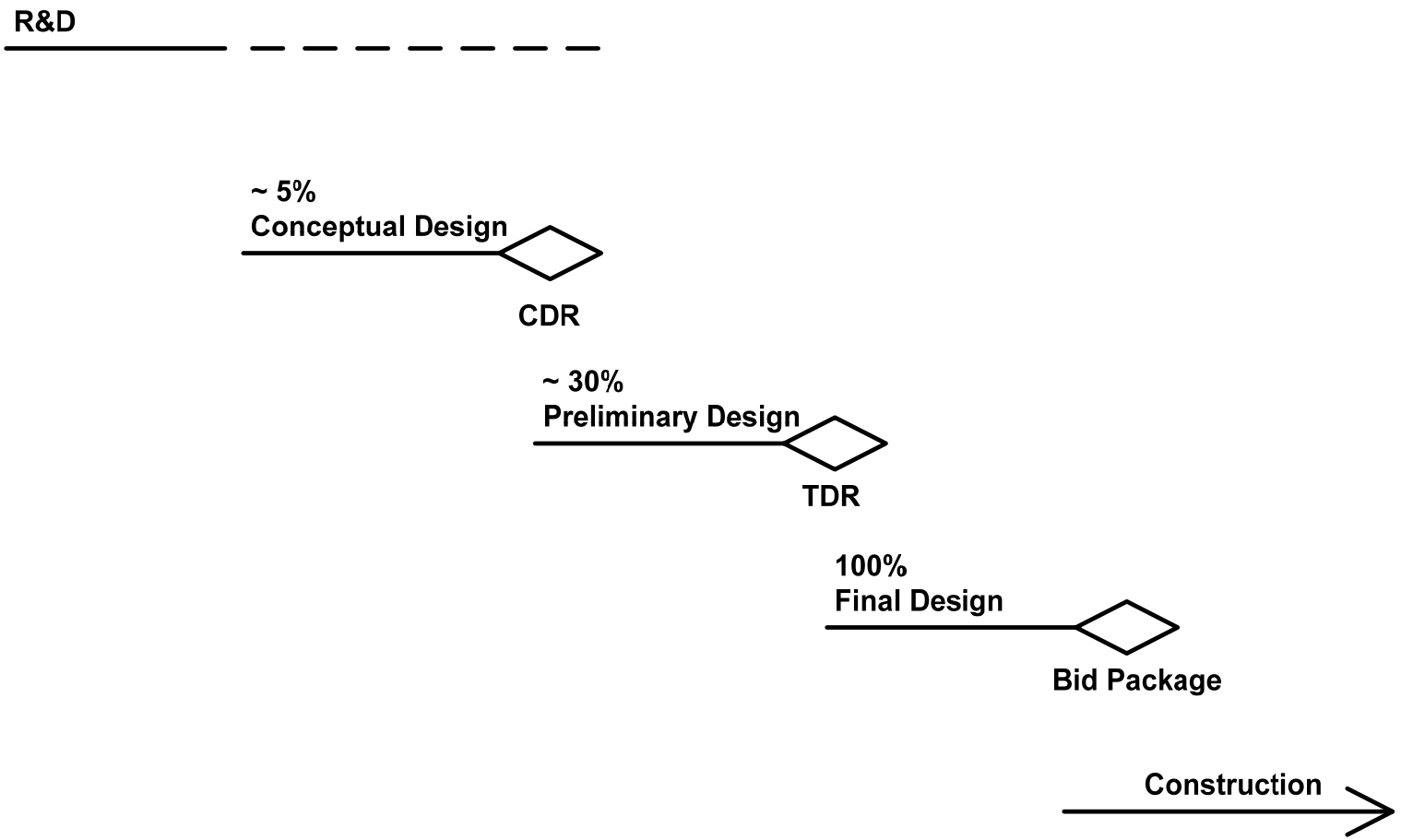
Head, Office of Project Management Oversight (OPMO)

September 28, 2008

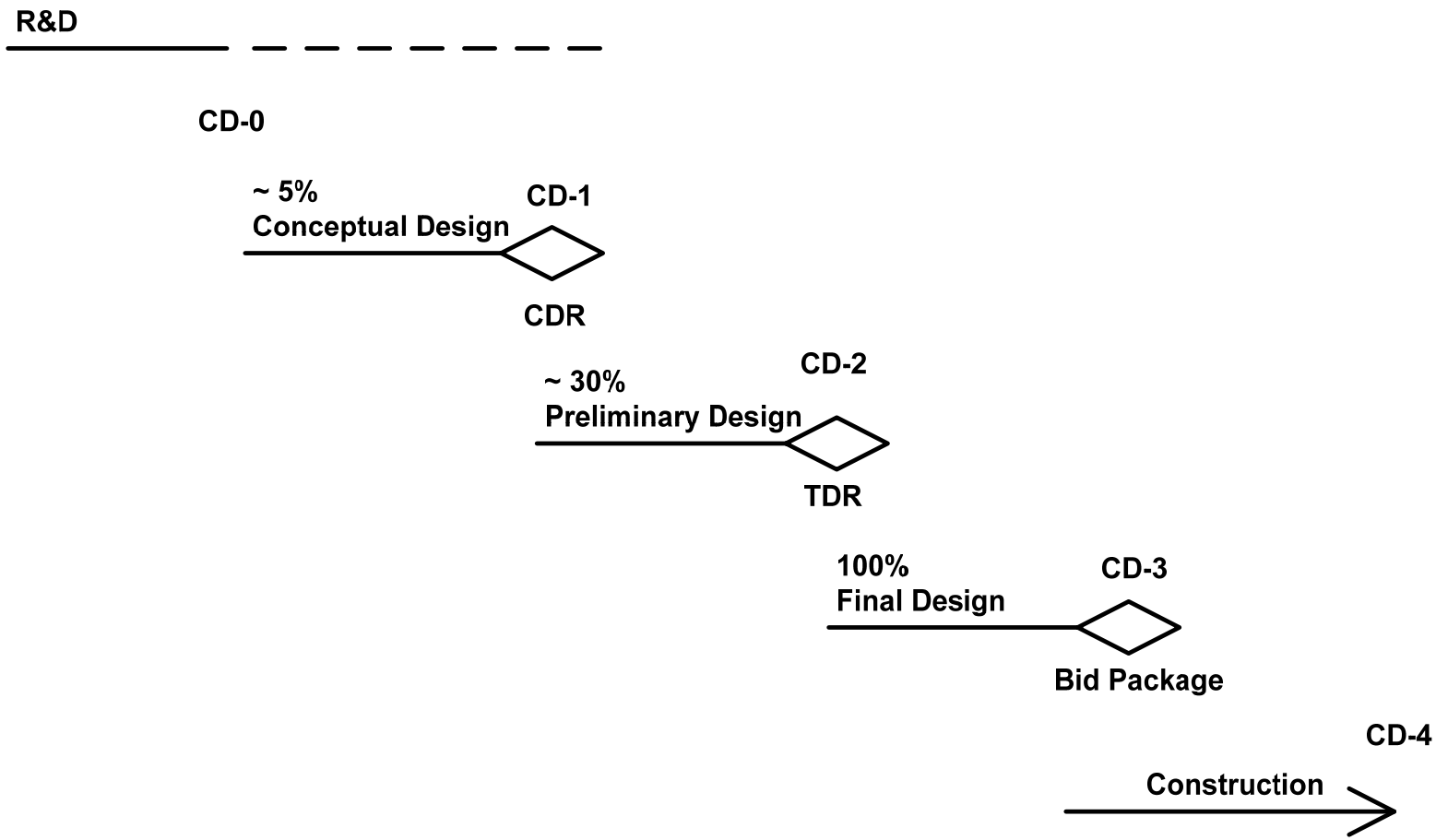
Outline

- Project Phases
- Project Acquisition Process and Critical Decisions
- DOE Order 413.3; Manual & Guide
- EIA Standards EIA-649 & 748-A
- FRA Project Management System
- Conceptual Design
- Next Steps

Project Design Phases



Project Design Phases



Typical DOE Acquisition Management System for Line Item Projects

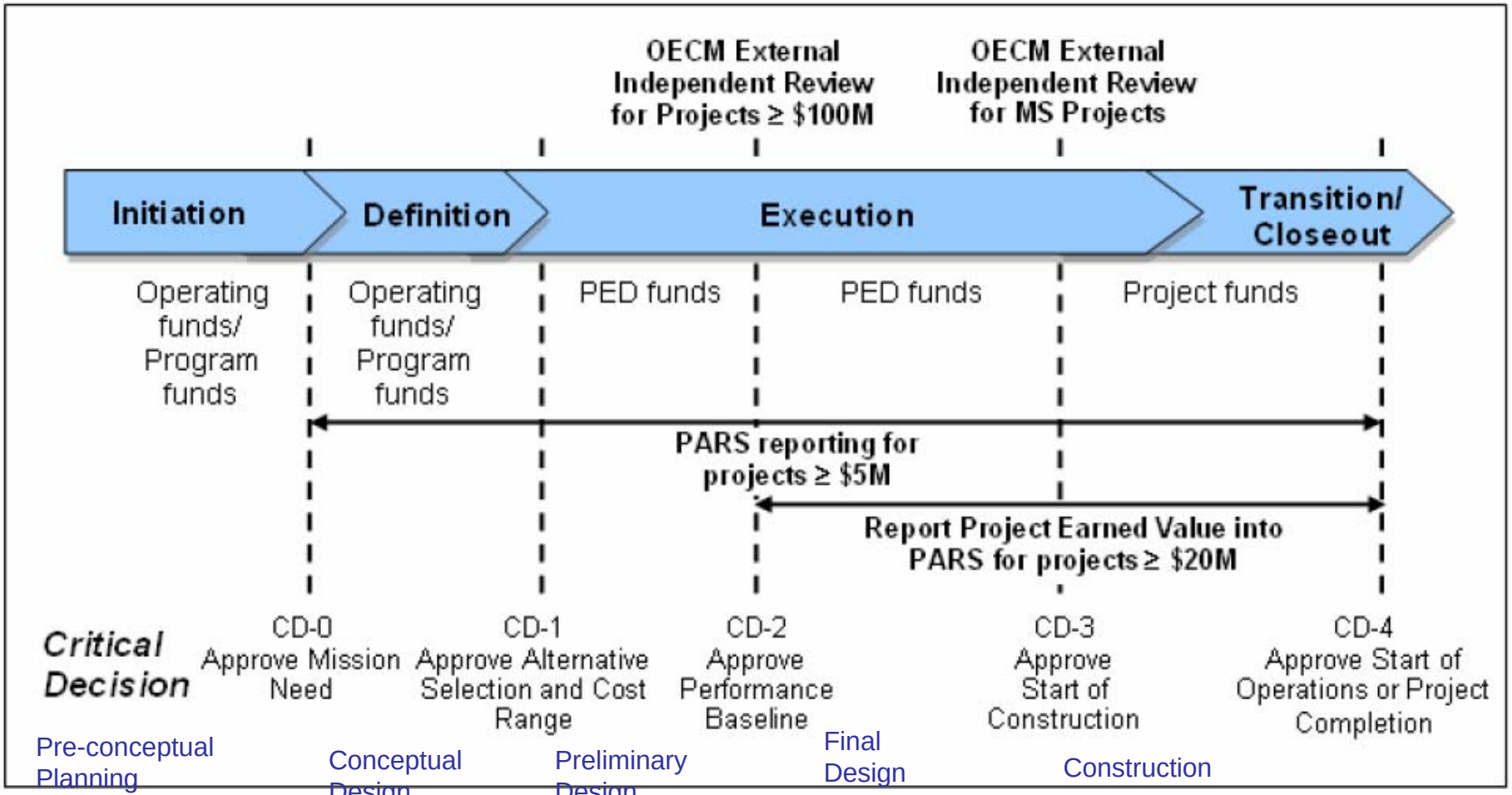


Figure 1. Typical DOE Acquisition Management System for Line Item Projects.

Critical Decision Authority Thresholds

Table 1. Critical Decision Authority Thresholds

Critical Decision Authority	Total Project Cost Thresholds*	Life Cycle Clean-Up Project Cost Thresholds*
Secretarial Acquisition Executive	≥ $750M (or any project on an exception basis when designated by the Secretarial Acquisition Executive) **No delegation authority**	≥ $1B (or any Clean-Up Project on an exception basis when designated by the Secretarial Acquisition Executive) **Delegation authority to Program Secretarial Office on an exception basis**
Under Secretaries	≥ $100M and < $750M (or any project on an exception basis when designated by the Under Secretaries) **Delegation authority to Program Secretarial Officer for projects < $400M**	Not Applicable
Program Secretarial Officer	≥ $20M** and < $100M **Delegation authority to a Program Manager or field organization manager. CD-0 may not be delegated below the Program Secretarial Officer.**	<$1B **Delegation authority to Headquarters or field Senior Executive Service manager. CD-0 may not be delegated below the Program Secretarial Officer.**
Chief Information Officer	> $5M and < $750M Departmental Information Technology Projects **No delegation authority**	Not Applicable

CD-0 Critical Decision Requirements

Table 2. Critical Decision Requirements

CD Requirements	
Order 413.3A Requirements*	**Approval Authority**
CD-0 Requirements	
Perform Pre-conceptual Planning activities that focus on the Program's strategic goals and objectives, safety planning, and design.	
Prepare a Mission Need Statement that documents a mission requirement that cannot be met through other than material means. Additionally, the Mission Need Statement will document the potential hazards and their safety, security, and risk implications.	Program Secretarial Officer (with recommendation from Program Analysis and Evaluation for projects with a Total Project Cost or Environmental Management Total Project Cost > $100M)
Prepare a Tailoring Strategy, if required, that describes the project's approach for appropriately adapting Critical Decision requirements based on the project's risk and complexity. The Tailoring Strategy may be included in the Project Execution Plan at later Critical Decisions.	Secretarial Acquisition Executive or Acquisition Executive
Perform a Mission Validation Independent Project Review on all Major System Projects.	Program Secretarial Officer

CD-1 Requirements

CD-1 Requirements	
Prepare a Conceptual Design Report which is an integrated systems engineering effort that results in a clear and concise definition of the project.	
Prepare an Acquisition Strategy that describes the high-level business and technical management approach designed to achieve project objectives within specified resource constraints.	Program Secretarial Officer (with recommendation from the Office of Engineering and Construction Management for Major System Projects).
Comply with the One-for-One Replacement legislation (excess space/offset requirement) as mandated in House Report 109-86.	
Prepare a preliminary Project Execution Plan, including a Risk Management Plan and Risk Assessment, that establishes the initial policy and procedures to be followed to manage and control project execution.	Secretarial Acquisition Executive or Acquisition Executive
Approve appointment of the Federal Project Director.	Secretarial Acquisition Executive or Acquisition Executive (with Program Manager recommendation)
Establish and charter an Integrated Project Team. An Integrated Project Team, led by the Federal Project Director, is a multi-disciplinary team, which includes safety expertise. The Charter includes membership, roles and responsibilities, decision making authority and operating guidance. The Charter may be included in the Project Execution Plan.	Secretarial Acquisition Executive or Acquisition Executive
Conduct a Design Review of the conceptual design. Design Reviews are performed to determine if a product (drawings, analyses, or specifications) is correct and will perform its intended functions and meet requirements. As part of the Design Review, for high-risk, high-hazard, and Hazard Category 1, 2, and 3 nuclear facilities, conduct a Technical Independent Project Review, the focus of which is to determine that the safety documentation is sufficiently conservative and bounding to be relied upon for the next phase of the project.	

continues see the Order DOE O 413.3A

DOE O 413.3A (Updated 2/2/07)

Preconceptual Planning	*Conceptual Design*	*Preliminary Design*	*Final Design*	*Construction*	*Operations*
❖	❖	❖	❖	❖	❖
CD-0	**CD-1**	**CD-2**	**CD-3**	**CD-4**	
Approve Mission Need	Approve Alternative Selection & Cost Range	Approve Performance Baseline	Approve Start of Construction	Approve Start of Operations or Project Completion	

Actions Authorized by Critical Decision (CD) Approval				
CD-0	**CD-1**	**CD-2**	**CD-3**	**CD-4**
• Proceed with Conceptual Design • Request PED funding • Start monthly PARS & Quarterly Project Performance reporting	• Allow Expenditure of PED Funds for preliminary design • Approval of long-lead procurement if necessary	• Establish Performance Baseline • Continue design • Request construction funding	• Approve expenditure of funds for construction	• Allow start of operations or project completion
Non-Nuclear Facilities--Prerequisite Activities for CDs				
• Review of Mission Need Statement (MSN) by Office of Program Analysis & Evaluation (CF-20) for $100M or greater. • Perform Mission Need Independent Project Review (IPR) for Major System (MS) projects (>=$750K) • Perform Pre-conceptual Planning • Evaluate Information Technology (IT) projects with Departmental Enterprise Architecture framework	• Review of Acquisition Strategy (AS) (OECM review for MS project) • Review of Conceptual Design o Requirements Analysis o Risk Analysis o Alternative Analysis o Value Management determination • Assess Requirements Analysis, Risk Analysis, Alternative Analysis, & Value Management. • Appoint FPD • Establish & charter Integrated Project Team • Ensure compliance with One-for-One Replacement requirement for building square footage • Ensure Integrated Safety Management Implementation • Ensure consideration for High Performance Sustainable Building • Assess if QA Program is acceptable	• Perform Baseline External Independent Review (EIR) & validation by OECM for $100M or greater. Perform Independent Cost Review or Independent Cost Estimates for MS project as part of EIR • Program IPR for $20M to less than $100M • Review of Preliminary Design • Establish compliant project EVMS for $20M or more, & OECM certifiable EVMS for project TPC with $50M or more • Conduct Value Engineering (as applicable) • Incorporate High Performance Sustainable Building provisions into design • Determine if QA Program is acceptable	• Perform Executability EIR by OECM for MS projects • Perform IPR for Non-MS projects by Program (SC)	• Verify Key Performance Parameter or Completion Criteria achieved • Perform Readiness Assessment or Operational Readiness Review • Revise environmental management system. <u>Post CD-4 Closeout</u> • Perform Final Administrative & Financial Closeout • Conduct Post Implementation Review for IT projects

Preconceptual Planning	*Conceptual Design*	*Preliminary Design*	*Final Design*	*Construction*	*Operations*
❖	❖	❖	❖	❖	❖
CD-0	**CD-1**	**CD-2**	**CD-3**		**CD-4**
Approve Mission Need	Approve Alternative Selection & Cost Range	Approve Performance Baseline	Approve Start of Construction		Approve Start of Operations or Project Completion

Prerequisite Documents

• MNS • Tailoring Strategy	• Acquisition Strategy • Conceptual Design Report • Risk Management Plan • Risk Assessment • Preliminary PEP, • Preliminary Hazard Analysis (HA), • Preliminary Security Vulnerability Assessment Report (SVAR) • Initial Cyber Security Plan for IT projects. • QA Program Documentation	• Performance Baseline • Preliminary Design • Updated Risk Assessment • Updated PEP • Updated HA (Approved at Field Level) • Updated Preliminary SVAR • NEPA Documentation • Updated Initial Cyber Security Plan for IT projects	• Final Design • Updated CD-2 documents • Updated QA Program • An Approved Construction Project Safety & Health Plan • Updated Cyber Security Plan for IT projects	• Checkout, Testing & Commissioning Plan • Project Transition/ Closeout Plan • Transition-to-Operations Plan • Finalized QA Plan, SVAR, HA Report, Construction Project Safety & Health Plan, • Finalized Cyber Security Plan for IT projects & completed Certification & Accreditation, as required <u>Post CD-4 Closeout</u> • Final Project Closeout Report • Lessons Learned Report • Required Operational Documentation

AS-Acquisition Strategy	MNS-Mission Need Statement	SAR-Safety Analysis Report
EIR-External Independent Review	MS-Major Systems	SDR-Safety Design Report
EVMS-Earned Value Mgmt. System	OECM-Office of Engr. & Const. Mgmt.	SER-Safety Evaluation Report
HA-Hazard Analysis	QA-Quality Assurance	SVAR-Security Vulnerability Assess. Report
IPR-Internal Project Review	PSVR-Prelim. Safety Validation Report	TPC-Total Project Cost

Budget Related Documents

- After CD-0 approval, Exhibit 300 for Projects –>$20M: Annual submission initiated during the federal budget cycle when funds are requested.
- Project Data Sheets: Annual submission initiated during the federal budget cycle when TEC funds are requested.

DOE Order 413.3; Manual & Guides EIA Standards EIA-649 & 748-A

- Handout Copy
  - 413 Order, Manual, Guides available at www.directives.doe.gov
- Standards must be purchased
  - EIA 649 Configuration Management
  - EIA 748-A Earned Value Management Systems

FRA PM System

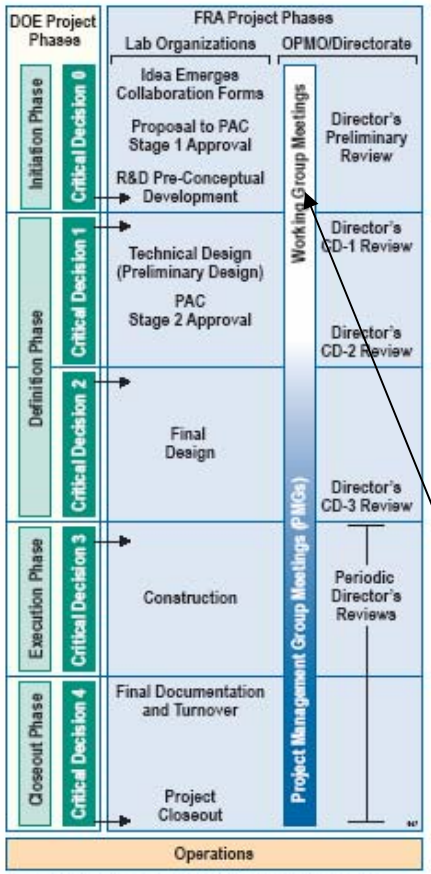


Figure 4.b–7. FRA Project Management System. Our systematic approach to project management controls scope, schedule, and cost in accordance with DOE's project management systems and DOE Order 413.3.

Figure from the FRA Proposal in Section 4b "Achieving Excellence in FNAL Operations Business Management"

Provides FNAL with powerful assets and capabilities including training for managers.

Available at FRA website:

http://fra-hq.org/about.html

Project Management Working Group Meetings (PM WGM)

Marshall (/ shepherd) the troops to meet the formally required Project Management documents, systems, and prepare for DOE Lehman CD (and other) Reviews

Much of the training is "just in time" and provided in the Project Management Working Group Meetings specific to each project.

OPMO Prior Project Document and Review Archive

- **http://www.fnal.gov/directorate/OPMO/Projects/home/base.htm**

- **Fermilab Projects**
- **Dark Energy Survey (DES)**
- **MINERvA**
- **MicroBooNE**
- **NOvA**
- **Proton Plan**
- **Project X**
- **Super NuMI (SNuMI)**
- **Completed Fermilab Projects**
- **Run IIb Upgrade DZero**
- **Non-Fermilab Projects**
- **Argonne Leadership Computing Facility (ALCF)**
- **ITER**
- **National Synchrotron Light Source II (NSLS-II)**

Conceptual Design

- Definition from Manual (page A-6)

Conceptual Design. The concept for meeting a mission need. The conceptual design process requires a mission need as an input. Concepts for meeting the need are explored and alternatives considered arriving at the set of alternatives that are technically viable, affordable and sustainable.

Conceptual Design

- Descriptive Paragraph from the Manual (Section 5.2)

5.2 CONCEPTUAL DESIGN

The conceptual design effort is dependent on the nature of the need. While it is normal for solutions to quickly present themselves in response to a need, the conceptual design process must be approached methodically to ensure that the arrived at solution or alternatives are not merely responsive to an approved need, but are within the current technology, are affordable, and provide the best value to the Department. Research, development, testing and other efforts may be required that will contribute to the concept. The conceptual design process may also require negotiation with outside organizations, stakeholders or other legal entities to agree on functional, technical, operational requirements, performance requirements or standards. Value management is a key ingredient in the process that supports reaching the lowest cost alternatives. Value management should be employed as early as possible in the project development and design process so recommendations can be included in the planning and implemented without delaying the progress of the project or causing significant rework of completed designs. Value management conducted during the early phases of capital asset acquisition yields the greatest cost reductions.

Conceptual Design

DOE M 413.3

5.2.4 Conceptual Design Report

The Conceptual Design Report is developed during the conceptual exploration and design process when the outcome is envisioned as an asset that performs a specific function. When used in this Manual, the Conceptual Design Report refers to the documentation that identifies the requirements and concept for fulfilling those requirements. The Conceptual Design Report is often the first technical document produced during the acquisition process. It is a necessary element in decision making because it presents the results of analysis of requirements, risks, and alternatives to arrive at a recommended solution. The conceptual design or equivalent should clearly and concisely describe the recommended alternative, the requirements and functions that must be performed and the key performance parameters that form the basis of the Performance Baseline. When the purpose of the project is remediation, restoration, or demolishing, other forms of documenting the requirements and alternative(s) may be used.

Common elements of the report may include the following (and other items not listed) as necessary to support the transition from concept to design.

- A description of the recommended alternative (design or characterization) and a synopsis of the development activities. In remediation projects, the report is a combination of applicable regulations and characterization.
- A schedule and cost range (or rough order of magnitude cost) including resources necessary to complete the design and preparation activity. Including identified resources necessary for a Project Engineering Design budget request, when required.
- An alternatives analysis including life-cycle costs, operational considerations, site development considerations, relationships to other site activities, and the comparison of alternatives, the risks, and the determined preferred alternative. Life-cycle costs are to include decontamination and demolition, transition (personnel and equipment moves), utilities, and maintenance including comparisons that incorporate a review of research and development and/or technology development challenges presented by the selected alternative.
- A preliminary Safeguards and Security Plan
- Performance parameters that are responsive to the mission need
- A preliminary Project Execution Plan
- The summary test and acceptance criteria
- The Work Breakdown Structure, which identifies the elements of the end product and dictionary

Conceptual Design

DOE M 413.3

- Condition assessments for the facilities, if the project is upgrading existing facilities. These assessments may confirm the suitability of facilities for the proposed action.
- A waste minimization/pollution identification and prevention plan, and a Waste Management Plan including control, storage, treatment, and disposal commensurate with the type of asset and maturity of the planning
- A draft Decontamination and Decommissioning Plan, if required
- Assessments of and strategy for:

  —*The National Environmental Policy Act (NEPA).* The level of NEPA documentation required and the plan for completing these documents in support of the proposed project schedule.

  —*Safety.* The level of safety documentation required for the project, and the plan for completing these documents in support of the proposed project schedule. An initial Hazards Assessment and/or Preliminary Safety Analysis.

  —*Security Considerations.*

  —*Site Selection.* The application of a coherent, defensible methodology to identify and evaluate site options.

  —*Waste Management.* Decontamination and decommissioning plans where appropriate and applicable; waste minimization efforts.
- Public and/or stakeholder input
- Preliminary interface control documents
- System requirements and applicable codes and standards for design, procurement, construction, or characterization
- Site selection criteria and site surveys/ evaluations
- Anticipated/project products/deliverables (project end-state)
- Known and anticipated project constraints
- Conceptual design drawings/renderings/calculations
- Readiness assessment or readiness review concepts
- A vulnerability assessment
- A preliminary plan for demobilization and/or disposal of facilities being replaced

Design Terminology

Circa August 2003

Helen,

I was reading from Attachment 4, Project Acquisition Process and Critical Decisions of the attached pdf document to answer your questions this morning.

Furthermore I suggested the following 1 to 1 correlations

Equipment	Buildings	Design Fraction Complete
Conceptual Design	Conceptual Design	O(5%)
Preliminary Design	Title I	O(30%)
Final Design	Title II	O(100%)
Acceptance	Title III	QA thru Project Completion

On Detector Projects we frequently talk about a Proposal and then a Technical Design Report. Appropriately cast information at the Proposal stage may sometimes be equivalent to a Conceptual Design and the Technical Design Report might correspond to something like the Preliminary Design.

Sincerely,

Ed.

PS: I'm not sure how my table of correlations will come out in the email. I may have to create it in an attached file and resend.

Possible Project X Schedule

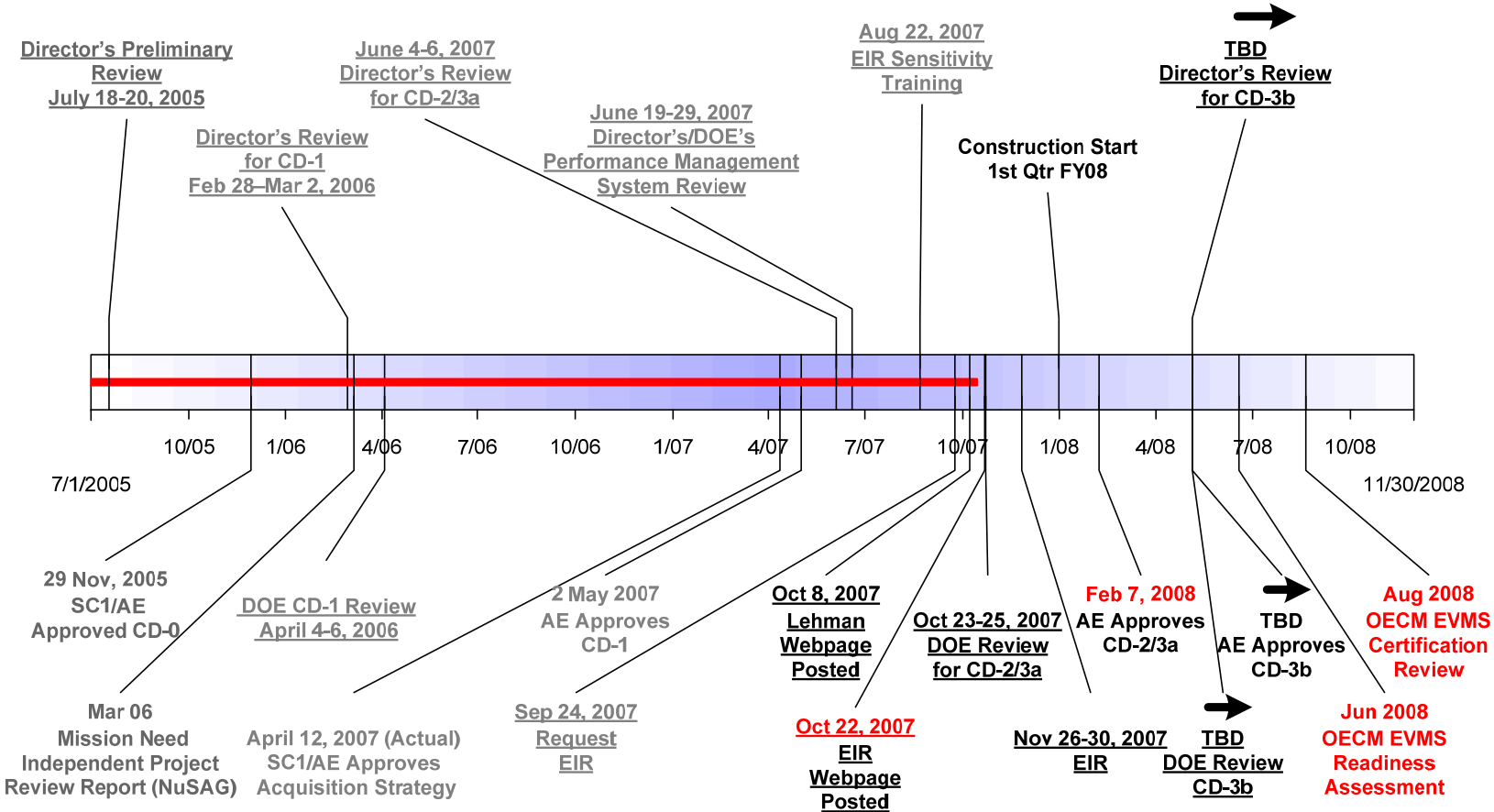
- Near Term Activities / Goals
  - 2008 Sept / Oct Initial Configuration Document complete
  - 2009 Feb Director's Preliminary Review supports CD-0
  - DOE Lehman Review IPR for CD-0 (Independent Project Review)
- Longer Term Goal
  - FY 2013 "Construction Start"
- See Hoffer / McCluskey presentations for much more detail

CD-0

- DOE G 413.1-17 “Mission Need Statement Guide”
  - this is a DOE document prepared by the HQ Program Office (OHEP for Fermilab)
  - background information is supplied by the lab
  - occasionally a “draft” document provided to HQ
- CD-0 “package” prepared to support a CD-0 ESAAB (Energy Systems Acquisition Advisory Board) meeting.

DRAFT NOvA Project Timeline for Critical Decisions & Reviews

Updated 08-Oct-07



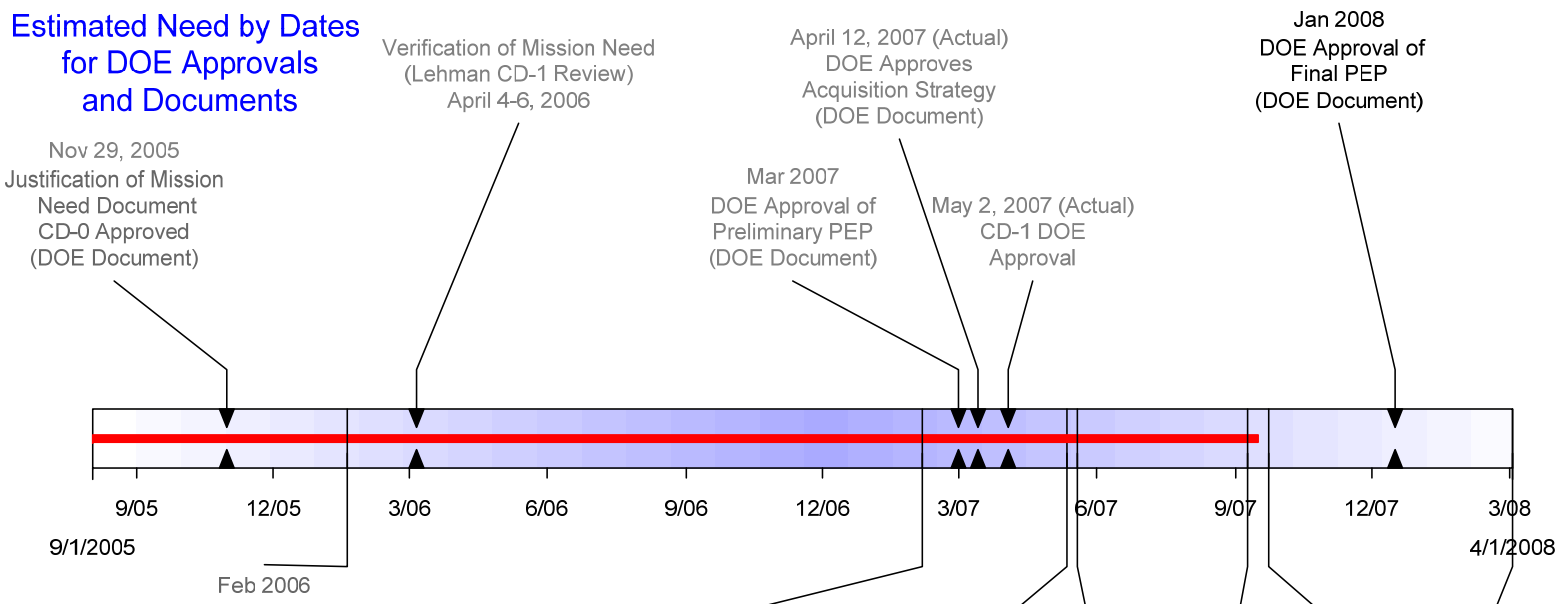
Note:

- Text in Red indicates change from prior version
- Text in Gray indicates activity is complete

NOvA Project
Draft Critical Design Prerequisites
Updated 01-Oct-07

Fermilab

Estimated Need by Dates for DOE Approvals and Documents



CD-1 Docs:
- Conceptual Design Report (CDR)
- Baseline Range and Resource Loaded Schedule
- Draft Configuration Management Document
- Preliminary PMP
- Preliminary Hazard Analysis Report
- Value Management Documentation
- Draft Risk Management Plan

CD-2/3a Docs:
- Technical Design Report (TDR)
- Baseline Cost Est. and Baseline Resource Loaded Schedule
- Final Configuration Management Document
- Final PMP
- NEPA and Approved Safety Documents
- Final Design & Procurement Packages for Long Lead Time Items for CD-3a
- Updated Value Management Documentation
- Final Risk Management Plan

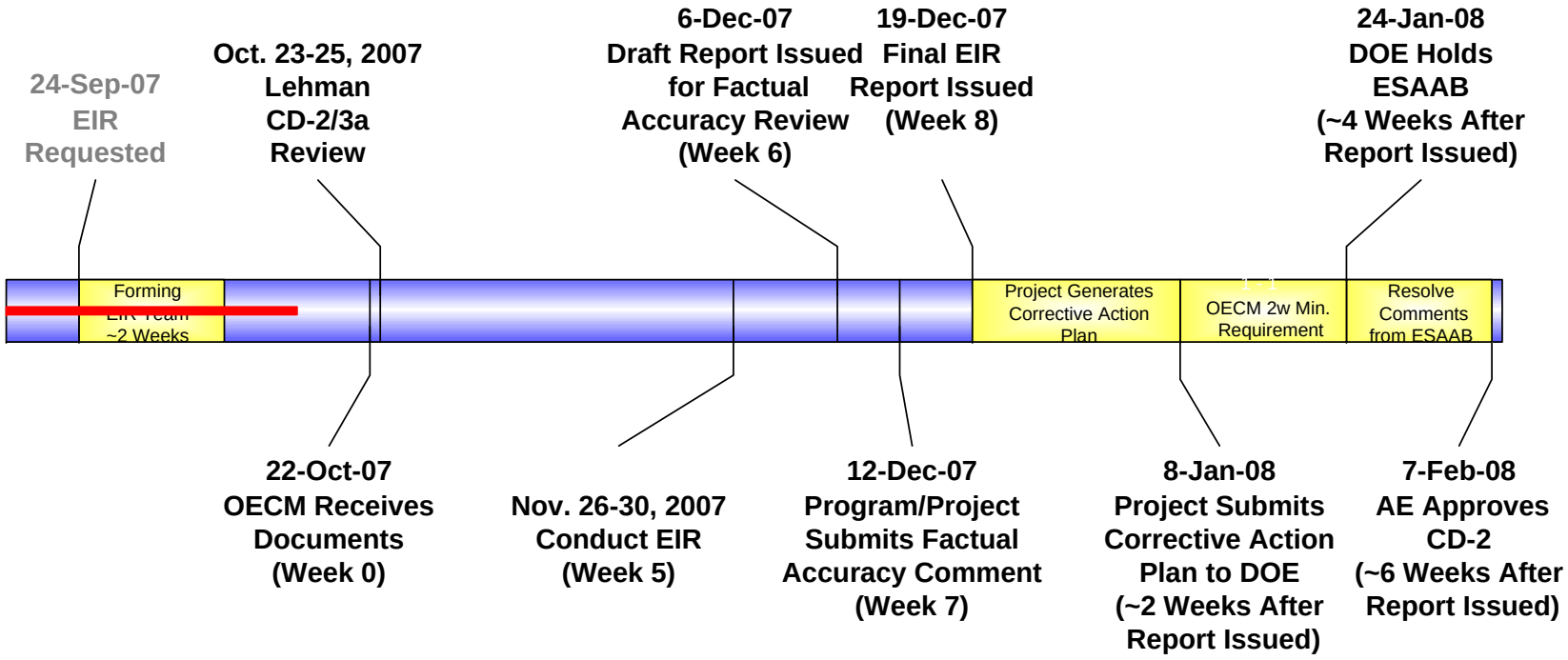
TBD for CD-3b
- Updated CD-2 Documents
- Final Design Complete or design is sufficiently mature to start procurement or construction

Target Completion Dates for NOvA Documents

Note:
- Text in Red indicates change from prior version
- Text in Gray indicates activity is complete

External Independent Review (EIR) Process Timeline

Updated (08-Oct-07)



Note:

- Text in Red indicates change from prior version
- Text in Gray indicates activity is complete

Action Items

(New Items from Oct. 2 WGM)

1) Address Pepin's request that FNAL Procurement Representative signoff on NOvA's Acquisition Plan [Ron Ray, Bob Cibic]
2) Determine if DOE FSO can electronically signoff documents in NOvA's Docdb [Alan Wehmann]
3) Discuss FY2011 shutdown schedule start date with Steve Holmes and Roger Dixon and get back with NOvA. [Hugh Montgomery]
4) Send to Dean the name and contact information of EIR Reviewer that needs access to NOvA's project file and Open Plan to start process for getting the reviewer access rights. [Pepin Carolin]

(Carryover from Sept. 18 WGM)

5) Develop document that describes assumptions used in building the schedule. [Ron Ray/Bill Freeman]

(Carryover from Sept. 04 WGM)

6) Send copy of updated EA to ES&H (Bill Griffing) and Mike Martens to review prior to notification to Fermi's nearest neighbors about submittal of EA. [John Cooper]

DOE 413.3 Attachment 1 - CONTRACTOR REQUIREMENTS DOCUMENT

1. Earned Value Management System (Not required if <$20M)
2. Monthly Reports
3. Acquisition Plan
4. Technical performance analyses and corrective action plans
5. Critical path schedule and Project Master Schedule
6. Cost estimate; (Basis of Estimate)
7. Risk identification, quantification and mitigation
8. Integrated technical, cost, and schedule baseline
9. Configuration Management
10. Value Engineering
11. Quality Assurance Program
12. Integrated Safety Management System
13. Sustainable Building Design

DOE O 413.3 Attachment 1

CONTRACTOR REQUIREMENTS DOCUMENT

DOE O 413.3, PROJECT MANAGEMENT FOR THE ACQUISITION OF CAPITAL ASSETS

The Department of Energy (DOE) prime contractor's project management system must satisfy the following requirements.

1. The industry standard for project control systems described in American National Standards Institute (ANSI) EIA-748, *Earned Value Management Systems*, must be implemented on all projects with a total project cost (TPC) greater than $20M for control of project performance during the project execution phase.

2. Cost and schedule performance, milestone status, and financial status must be reported to DOE on a monthly basis using DOE-approved work breakdown structure elements and data elements for all projects with a TPC greater than or equal to $20M, except for time-and-materials contracts, firm fixed-priced contracts, or level-of-effort support contracts, for control of project performance during the project execution phase. The report must also include variance analyses and corrective action plans that integrate cost, schedule, and scope if variances exceed DOE-established reporting thresholds. Also reported will be analyses of cost and schedule trends, financial status, and baseline change control activity, including the allocation of management reserve, potential problems, and critical issues.

Qtrly

DOE O 413.3 Attachment 1 (cont.)

3. For project contracts that will be accomplished by M&O/M&I contractors, the contractor must have a written Acquisition Plan that is appropriate for the requirement and dollar value of each contract and consistent with the intent of the FAR. The Acquisition Plan for a project contract to be awarded by an M&O/M&I contractor is developed by a team of contractor employees including, as a minimum, the prospective Project Manager and Contract Negotiator. The Acquisition Plan will also be concurred in by the DOE Contracting Officer.

4. Technical performance analyses and corrective action plans must be reported to DOE for variances to the project baseline objectives resulting from design reviews, component and system tests, and simulations.

5. A critical path schedule and a project master schedule must be developed and maintained.

6. Cost estimating must be an integral part of cost baseline and life-cycle cost development and maintenance, budget request development, and estimates at completion.

7. Project technical, cost, and schedule risks must be identified, quantified, and mitigated (as appropriate). Risk mitigation strategies must be developed and implemented.

8. An integrated contractor technical, cost, and schedule baseline must be developed and maintained through the use of a contractor-level change control board.

DOE O 413.3 Attachment 1 (cont.)

9. A configuration management process must be established that controls changes to the physical configuration of project facilities, structures, systems, and components in compliance with ANSI/EIA-649, *National Consensus Standard for Configuration Management*. This process must also ensure that the configuration is in agreement with the performance objectives in the technical baseline.

10. A value engineering process must be used that identifies high-cost project activities in order to realize a maximum return on investment through the use of systems engineering trade-offs and functional analyses that identify alternate means of achieving the same function at a lower life-cycle cost.

11. A quality assurance program must be developed and implemented for the contract scope of work in compliance with DOE O 414.1A, QUALITY ASSURANCE, at the beginning of the project and maintained over the project life. This program must assign responsibilities and authority for quality, define policy and requirements, and provide for the performance and assessment of work.

12. An Integrated Safety Management system must be developed and implemented for the contract scope of work in compliance with DEAR 970-5204-2, Integration of Environmental, Safety and Health into Work Planning and Execution.

13. Sustainable building design principles must be applied to the siting, design, and construction of new facilities.

Next Steps

Regular Project X PM WGMs
in addition to
regular Project X project meetings

Frequency of PX PM WGMs will vary
suggest monthly to start
(open for discussion)